



# Application Guide

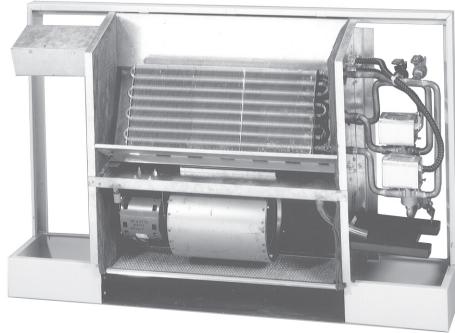
VFB Series  
VSB Series  
VCB Series  
WCB Series

Vertical Console

Fan Coils

300-1200 CFM

This application guide includes expanded cooling and heating data as well as typical connection diagrams and standard valve/piping package configurations.



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## 3 Row Performance Data

CHILLED WATER COOLING CAPACITY - 3 ROW															
UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	45°F ENTERING WATER						42°F ENTERING WATER					
				80°F DB/67°F WB ENTERING AIR			75°F DB/63°F WB ENTERING AIR			80°F DB/67°F WB ENTERING AIR			75°F DB/63°F WB ENTERING AIR		
				TOTAL MBH	SENS. MBH	TEMP. RISE									
3	280 (HIGH)	1.0	2.1	6.7	5.6	13.4	5.6	5.6	11.2	7.3	5.9	14.7	5.6	5.2	11.2
		2.0	6.3	8.9	6.5	9.0	6.8	5.7	6.8	9.8	6.8	9.8	7.4	5.9	7.5
		3.0	12.0	9.8	6.8	6.5	7.5	5.9	5.0	10.7	7.1	7.1	8.2	6.2	5.5
	240 (MED)	1.0	2.1	6.5	5.2	13.1	5.0	4.6	10.0	7.1	5.4	14.2	5.4	4.7	10.9
		2.0	6.3	8.3	5.9	8.3	6.4	5.1	6.4	9.1	6.1	9.1	6.9	5.3	6.9
		3.0	12.0	9.1	6.1	6.0	6.9	5.3	4.6	9.9	6.5	6.6	7.6	5.6	5.0
4	400 (HIGH)	1.5	3.9	10.5	8.4	14.0	9.0	7.4	10.7	11.4	8.8	15.2	8.7	7.7	11.6
		2.2	7.9	12.3	9.0	11.1	9.4	7.9	8.5	13.4	9.5	12.1	10.2	8.3	9.3
		3.0	14.1	13.4	9.5	8.9	10.2	8.3	6.8	14.6	9.9	9.7	11.1	8.6	7.4
	320 (MED)	1.5	3.9	9.8	7.3	13.1	7.5	6.4	10.0	10.7	7.7	14.3	8.2	6.7	10.9
6	600 (HIGH)	3.0	6.5	17.0	12.9	11.4	13.0	11.4	8.7	18.6	13.5	12.4	14.2	11.9	9.5
		4.0	11.3	18.6	13.5	9.3	14.2	11.9	7.1	20.3	14.2	10.1	15.5	12.4	7.7
		5.0	17.4	19.6	13.9	7.9	15.0	12.2	6.0	21.4	14.6	8.6	16.4	12.7	6.6
	430 (MED)	3.0	6.5	14.7	10.4	9.8	11.2	9.1	7.5	16.1	11.0	10.7	12.3	9.5	8.2
8	800 (HIGH)	4.0	7.2	22.1	16.9	11.1	16.9	14.9	8.4	24.1	17.7	12.1	18.4	15.5	9.2
		5.0	10.9	23.8	17.6	9.5	18.2	15.4	7.3	26.0	18.4	10.4	19.8	16.1	7.9
		6.0	15.3	25.1	18.0	8.4	19.1	15.8	6.4	27.3	18.9	9.1	20.8	16.5	7.0
	680 (MED)	4.0	7.2	20.7	15.3	10.3	15.8	13.4	7.9	22.5	16.0	11.3	17.2	13.9	8.6
10	1000 (HIGH)	6.0	9.0	29.7	23.2	9.9	22.7	20.5	7.6	32.4	24.2	10.8	24.7	21.3	8.2
		7.0	11.9	31.0	23.7	8.9	23.7	20.8	6.8	33.8	24.8	9.7	25.8	21.7	7.4
		8.0	15.3	32.1	24.1	8.0	24.5	21.2	6.1	34.9	25.2	8.7	26.7	22.0	6.7
	880 (MED)	6.0	9.0	27.6	21.1	9.2	21.1	18.5	7.0	30.1	22.0	10.0	23.0	19.3	7.7
12	1200 (HIGH)	6.5	10.4	34.8	27.6	10.7	26.6	24.3	8.2	38.0	28.7	11.7	29.0	25.2	8.9
		7.5	13.6	36.3	28.1	9.7	27.8	24.7	7.4	39.6	29.3	10.6	30.2	25.7	8.1
		8.5	17.1	37.6	28.6	8.8	28.7	25.1	6.8	41.0	29.9	9.6	31.3	26.1	7.4
	1030 (MED)	6.5	10.4	32.0	24.6	9.8	24.4	21.6	7.5	34.9	25.6	10.7	16.6	22.4	8.2
		7.5	13.6	33.3	25.1	8.9	25.4	22.0	6.8	36.3	26.2	9.7	17.8	22.9	7.4
		8.5	17.1	34.4	25.5	8.1	26.3	22.3	6.2	37.5	26.6	8.8	28.7	23.2	6.7

HOT WATER HEATING CAPACITY - 3 ROW														
UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE			UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE			
				140°F	160°F	180°F					140°F	160°F	180°F	
3	280 (HIGH)	1.5	4.0	14.8	19.0	23.3	8	800 (HIGH)	4.0	7.2	40.6	52.3	63.9	
		2.5	9.0	15.7	20.2	24.7			5.0	10.9	41.8	53.8	65.7	
	240 (MED)	3.5	15.3	16.2	20.7	25.4		680 (MED)	6.0	15.3	42.6	54.8	67.0	
		1.5	4.0	13.4	17.2	21.0			4.0	7.2	36.5	46.9	57.3	
4	400 (HIGH)	2.5	10.0	22.0	28.3	34.6	10	1000 (HIGH)	6.5	10.4	56.1	72.2	88.2	
		3.5	18.7	22.8	29.3	35.8			8.0	15.3	57.4	73.8	90.2	
		1.5	3.9	17.7	22.8	27.8			5.0	6.4	49.7	63.9	78.1	
	320 (MED)	2.5	10.0	18.8	24.1	29.5		880 (MED)	6.5	10.4	51.4	66.0	80.7	
6	600 (HIGH)	3.0	6.5	31.1	39.9	48.8			8.0	15.3	52.4	67.4	82.4	
		4.0	11.3	32.2	41.4	50.6		1200 (HIGH)	5.5	7.7	64.4	82.8	101.2	
		5.0	17.4	32.9	42.3	51.7			7.0	12.0	66.5	85.5	104.5	
	430 (MED)	3.0	6.5	24.7	31.8	38.9		1030 (MED)	5.5	7.7	58.1	74.8	91.4	
	4.0	11.3	25.4	32.6	39.9	40.6			7.0	12.0	59.8	76.9	94.0	
	5.0	17.4	25.8	33.2	40.6	40.6			8.5	17.1	61.0	78.5	95.9	

Note: Ratings at 70°F entering air temperature

## 4 Row Performance Data

CHILLED WATER COOLING CAPACITY - 4 ROW															
UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	45°F ENTERING WATER						42°F ENTERING WATER					
				80°F DB/67°F WB ENTERING AIR			75°F DB/63°F WB ENTERING AIR			80°F DB/67°F WB ENTERING AIR			75°F DB/63°F WB ENTERING AIR		
				TOTAL MBH	SENS. MBH	TEMP. RISE	TOTAL MBH	SENS. MBH	TEMP. RISE	TOTAL MBH	SENS. MBH	TEMP. RISE	TOTAL MBH	SENS. MBH	TEMP. RISE
3	280 (HIGH)  240 (MED)	1.0	1.8	6.7	6.1	14.8	5.7	5.4	11.3	8.1	6.3	16.2	6.2	5.5	12.3
		2.0	6.5	8.9	7.0	9.9	7.5	6.1	7.5	10.8	7.3	10.8	8.2	6.4	8.2
		3.0	13.9	9.8	7.3	7.2	8.3	6.4	5.5	11.8	7.7	7.9	9.0	6.7	6.0
4	400 (HIGH)  320 (MED)	1.0	1.8	6.5	5.5	14.4	5.5	4.9	11.0	7.8	5.8	15.6	6.0	5.1	12.0
		2.0	6.5	8.3	6.3	9.2	7.0	5.5	7.0	10.0	6.6	10.0	7.6	5.7	7.6
		3.0	13.9	9.1	6.6	6.7	7.6	5.7	5.1	10.9	7.0	7.2	8.3	6.0	5.5
6	600 (HIGH)  430 (MED)	1.0	2.4	9.8	7.1	17.5	6.7	6.3	13.4	9.5	7.4	19.1	7.3	6.5	14.6
		2.0	8.2	11.1	8.3	11.9	9.1	7.2	9.1	12.9	8.7	12.9	9.9	7.5	9.9
		3.0	16.8	12.0	8.8	8.8	10.0	7.6	6.7	14.3	9.2	9.6	10.9	7.9	7.3
8	800 (HIGH)  680 (MED)	1.0	2.4	22.1	18.3	12.3	12.8	11.6	10.2	18.2	13.7	14.6	139	12.1	11.1
		2.0	13.3	23.8	19.0	10.6	20.2	16.6	8.1	28.8	19.9	11.5	22.0	17.4	8.8
		3.0	18.4	25.1	19.6	9.3	21.2	17.1	7.1	30.3	20.5	10.1	23.1	17.8	7.7
10	1000 (HIGH)  880 (MED)	1.0	2.4	27.6	21.6	10.4	21.7	18.9	7.9	31.0	22.6	11.3	23.7	19.7	8.6
		2.0	10.2	31.0	25.0	9.0	25.9	21.9	6.9	37.0	26.2	9.9	28.2	22.9	7.5
		3.0	15.4	32.1	25.8	7.6	27.4	22.5	5.8	39.1	27.0	8.2	29.9	23.5	6.3
12	1200 (HIGH)  1030 (MED)	1.0	2.4	34.8	29.4	10.4	29.9	25.8	8.0	42.6	30.8	11.4	32.6	26.9	8.7
		2.0	13.7	36.3	29.9	9.5	30.9	26.2	7.3	44.1	31.3	10.4	33.7	27.3	7.9
		3.0	17.0	37.6	30.4	8.8	31.8	26.6	6.7	45.4	31.8	9.6	34.7	27.7	7.3

HOT WATER HEATING CAPACITY - 4 ROW														
UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE			UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE			
				140°F	160°F	180°F					140°F	160°F	180°F	
3	280 (HIGH)  240 (MED)	1.5	3.8	15.8	20.3	24.8	8	800 (HIGH)	3.0	5.4	41.5	53.3	65.2	
		2.5	9.9	16.7	21.5	26.3		4.5	11.0	44.2	56.8	69.4		
		3.5	18.5	17.2	22.1	27.0		6.0	18.4	45.6	58.6	71.7		
4	400 (HIGH)  320 (MED)	1.5	3.8	14.2	18.2	22.3	10	680 (MED)	3.0	5.4	37.3	47.9	48.6	
		2.0	9.9	14.9	19.1	23.4		4.5	11.0	39.4	50.7	61.9		
		3.0	18.5	15.2	19.6	24.0		6.0	18.4	40.6	52.2	63.7		
6	600 (HIGH)  430 (MED)	1.0	2.4	19.9	25.6	31.3	12	1000 (HIGH)	6.0	6.9	58.6	75.3	92.0	
		2.0	8.2	22.8	29.3	35.8		8.0	11.4	60.7	78.0	95.3		
		3.0	16.8	23.9	30.7	37.6		10.0	16.9	62.0	79.8	97.4		
8	800 (HIGH)  680 (MED)	1.0	2.4	17.4	22.4	27.4	10	880 (MED)	6.0	6.9	53.5	68.8	84.1	
		2.0	8.2	19.5	25.0	30.6		8.0	11.4	55.3	71.1	86.9		
		3.0	16.8	20.2	26.0	31.8		10.0	16.9	56.4	72.5	88.6		
10	1200 (HIGH)  1030 (MED)	2.5	5.6	31.7	40.7	49.8	12	1200 (HIGH)	6.0	7.0	68.7	88.3	108.0	
		3.5	10.2	33.4	43.0	52.5		8.0	12.2	71.4	91.8	112.2		
		4.5	16.0	34.4	44.2	54.0		10.0	18.7	73.1	94.0	114.9		
12	1030 (MED)	2.5	5.6	25.3	32.5	39.8	12	1030 (MED)	6.0	7.0	61.8	79.5	97.2	
		3.5	10.2	26.3	33.8	41.4		8.0	12.2	64.0	82.3	100.3		
		4.5	16.0	26.9	34.6	42.3		10.0	18.7	65.4	84.1	102.8		

Note: Ratings at 70°F entering air temperature

# 1 Row Performance Data

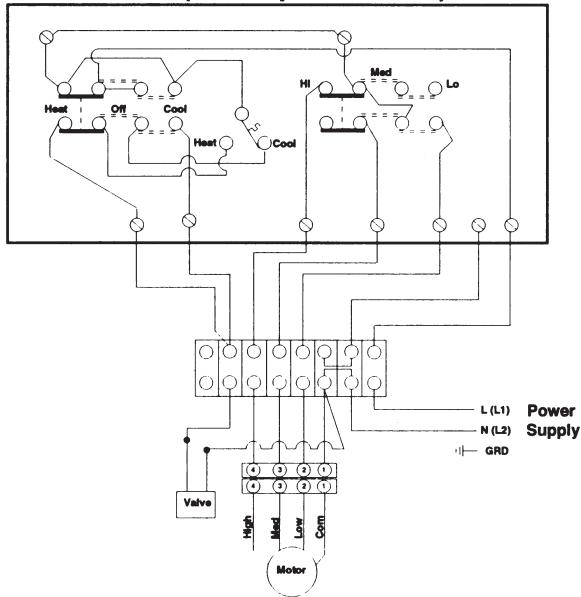
HOT WATER HEATING CAPACITY - 1 ROW													
UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE			UNIT SIZE (ALL MODELS)	CFM	GPM	P.D. (FT. WTR.)	HEATING BTUH (1000) AT ENTERING WATER TEMPERATURE		
				140°F	160°F	180°F					140°F	160°F	180°F
3	280 (HIGH)	1.0	3.4	8.2	10.6	12.9	8	800 (HIGH)	1.0	5.7	17.6	22.7	27.7
		1.75	9.3	8.9	11.4	13.9			1.5	11.6	19.8	25.4	31.1
	240 (MED)	2.5	17.7	9.0	11.6	14.2		680 (MED)	2.0	19.2	21.1	27.1	33.1
		1.0	3.4	7.6	9.8	12.0			1.0	5.7	16.6	21.4	26.2
4	400 (HIGH)	1.0	4.4	11.2	14.4	17.6	10	1000 (HIGH)	2.5	7.3	21.9	28.2	34.4
		1.75	11.7	12.3	15.8	19.3			3.5	12.9	23.2	29.8	36.4
	320 (MED)	2.5	21.9	12.7	16.3	20.0		880 (MED)	4.5	19.7	23.7	30.5	37.3
		1.0	4.4	10.1	13.0	15.9			2.5	7.3	20.6	26.5	32.4
6	600 (HIGH)	1.0	5.0	14.6	18.8	23.0	12	1200 (HIGH)	2.5	7.7	25.8	33.1	40.5
		1.75	13.3	16.6	21.4	26.2			3.5	13.9	27.5	35.4	43.2
	430 (MED)	2.5	24.9	17.4	22.4	27.4		1030 (MED)	4.5	21.8	28.4	36.5	44.7
		1.0	5.0	12.8	16.5	20.1			2.5	7.7	24.1	31.0	37.9

**NOTE:** Ratings at 70°F entering air temperature

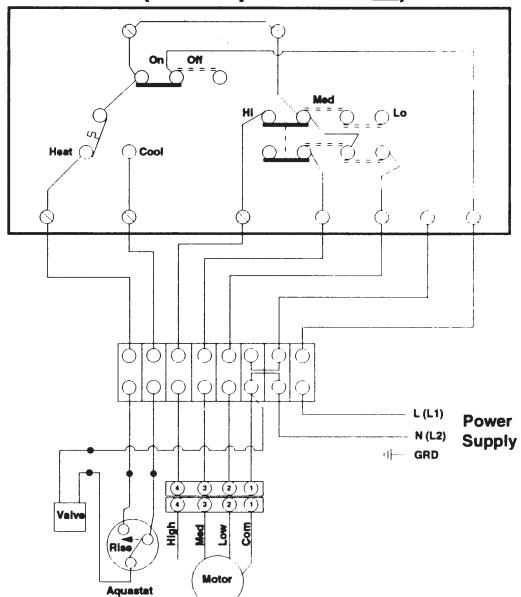
In keeping with its policy of continuous progress and product improvement, First Operations reserves the right to make changes without notice. Maintenance for all First Co. products is available under "Product Maintenance" at [www.firstco.com](http://www.firstco.com).

## Typical Connection Diagrams

**2-Pipe Heat / Cool  
Manual Changeover - Continuous Fan  
(T/stat option No. A\_\_)**

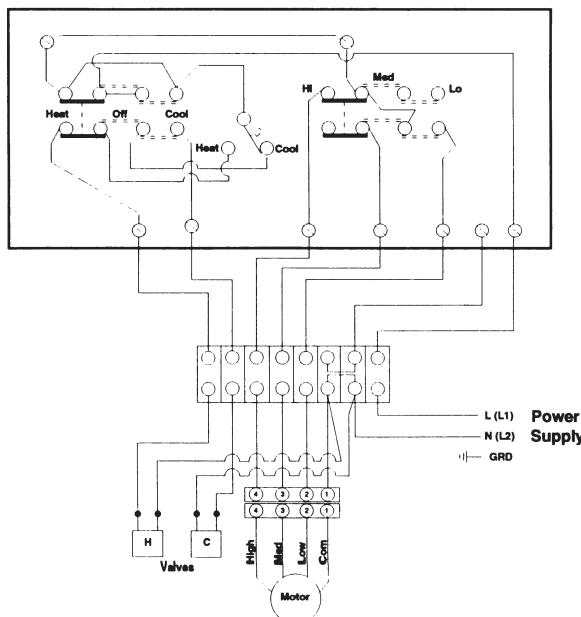


**2-Pipe Heat / Cool  
Auto Changeover - Continuous Fan  
(T/stat option No. B\_\_)**

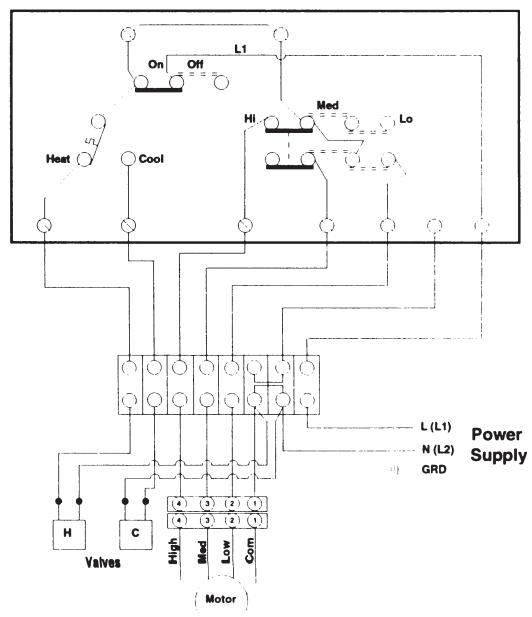


\* No aquastat lockout

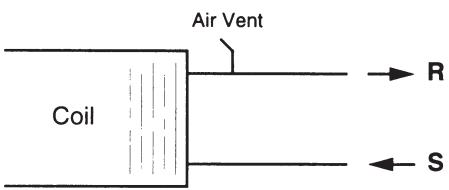
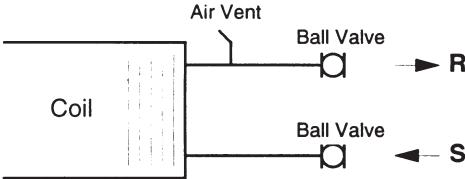
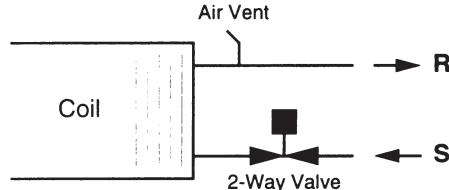
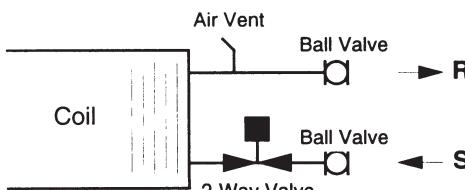
**4-Pipe Heat / Cool  
Manual Changeover - Continuous Fan  
(T/stat option No. M\_\_)**



**4-Pipe Heat / Cool  
Auto Changeover - Continuous Fan  
(T/stat option No. N\_\_)**



# Valve / Piping Packages

Configuration	Valve Package Code	Basic Application
<b>Standard Coil - No Valves</b>		
	- NV -	2 pipe or 4 pipe: For field added valve packages
<b>Ball Valves Only</b>		
	- BV -	2 pipe or 4 pipe: Coil with ball valves for field added valve packages
<b>2-Way Valve Only</b>		
	- 2 -	2 pipe or 4 pipe: <ul style="list-style-type: none"> <li>- 2 pipe Hydronic Heating only</li> <li>- 2 pipe Hydronic Cooling only</li> <li>- 2 pipe Hydronic Heating &amp; Cooling manual changeover (no aquastat lockout)</li> <li>- 2 pipe Hydronic cooling with total electric heat</li> <li>- 4 pipe Hydronic Heating &amp; Cooling</li> </ul>
<b>2-Way Valve with Ball Valves</b>		
	- 2B -	2 pipe or 4 pipe: <ul style="list-style-type: none"> <li>- 2 pipe Hydronic Heating only</li> <li>- 2 pipe Hydronic Cooling only</li> <li>- 2 pipe Hydronic Heating &amp; Cooling manual changeover (no aquastat lockout)</li> <li>- 2 pipe Hydronic cooling with total electric heat</li> <li>- 4 pipe Hydronic Heating &amp; Cooling</li> </ul>

## Valve / Piping Packages (con't)

Configuration	Valve Package Code	Basic Application
<b>3-Way Valve Only</b>		
	- 3 -	2 pipe or 4 pipe: - 2 pipe Hydronic Heating only - 2 pipe Hydronic Cooling only - 2 pipe Hydronic Heating & Cooling manual changeover (no aquastat lockout) - 2 pipe Hydronic cooling with total electric heat - 4 pipe Hydronic Heating & Cooling
<b>3-Way Valve with Ball Valves</b>		
	- 3B -	2 pipe or 4 pipe: - 2 pipe Hydronic Heating only - 2 pipe Hydronic Cooling only - 2 pipe Hydronic Heating & Cooling manual changeover (no aquastat lockout) - 2 pipe Hydronic cooling with total electric heat - 4 pipe Hydronic Heating & Cooling
<b>3-Way Valve with Ball Valve &amp; Circuit Setter</b>		
	- 3C -	2 pipe or 4 pipe: - 2 pipe Hydronic Heating only - 2 pipe Hydronic Cooling only - 2 pipe Hydronic Heating & Cooling manual changeover (no aquastat lockout) - 2 pipe Hydronic cooling with total electric heat - 4 pipe Hydronic Heating & Cooling
<b>3-Way Valve with Ball Valves &amp; Aquastat</b>		
	- 3D -	2 pipe: - 2 pipe Hydronic Heating & Cooling manual changeover - 2 pipe Hydronic Heating & Cooling Automatic changeover

# Model Number Nomenclature

**12 VC B 0 - 126 - 31 R - 2B - N1**

**CFM (100'S)**

3,4,6,8,10,12

**Unit Style**

VCB - Concealed  
VSB - Cabinet slope top  
VFB - Cabinet flat top  
WCB - Recessed wall

**Vintage**

**Electric Heat (KW)**

**Unit Voltage**

126 - 120V-1PH-60Hz  
246 - 208/240V-1PH-60Hz  
225 - 220V-1PH-50Hz

**Control Options**(see below)

NC = No Controls

**Valve Package**

See page 6 & 7

**Coil Connection**

R - Right Hand  
L - Left Hand

**Coil Type**

3 - 3 row  
4 - 4 row  
31 - 3 row cool, 1 row heat  
41 - 4 row cool, 1 row heat

## CONTROL OPTIONS FOR ELECTRIC VALVE PACKAGES

### 2 Pipe - Valve Cycle

SYSTEM	THERMOSTAT CONTROLS	CONTROL VALVE TYPE	CHANGEOVER CONTROL and LOCATION	THERMOSTAT ORDER OPTION
Heating and Cooling	Heat-Off-Cool Constant Fan Hi-Med-Low	Motorized 2-way or 3-way. Normally closed.	<b>Manual</b> Hot - Cool Switch on Thermostat	A1 - Unit Mount A2 - Wall Mount A3 - Unit Tamperproof
	On-Off Constant Fan Hi-Med-Low	Motorized 3-way Normally closed.	<b>Automatic (1)</b> Aquastat - Factory Mounted on Supply Line	B1 - Unit Mount B2 - Wall Mount B3 - Unit Tamperproof
		Motorized 2-way or 3-way Normally closed.	<b>Manual</b> Summer-Winter Switch (switch must be field supplied)	C1 - Unit Mount C2 - Wall Mount C3 - Unit Tamperproof
Cooling Only	On-Off Constant Fan Hi-Med-Low	Motorized 2-way or 3-way. Normally closed.	None	D1 - Unit Mount D2 - Wall Mount D3 - Unit Tamperproof
Heating Only	On-Off Constant Fan Hi-Med-Low	Motorized 2-way or 3-way. Normally closed.	None	E1 - Unit Mount E2 - Wall Mount E3 - Unit Tamperproof

### 4 Pipe - Valve Cycle

SYSTEM	THERMOSTAT CONTROLS	CONTROL VALVE TYPE	CHANGEOVER CONTROL and LOCATION	THERMOSTAT ORDER OPTION
Heating and Cooling	Heat-Off-Cool Constant Fan Hi-Med-Low	Motorized 2-way or 3-way. Normally closed.	<b>Manual</b> Hot - Cool Switch on Thermostat	M1 - Unit Mount M2 - Wall Mount M3 - Unit Tamperproof
	On-Off Constant Fan Hi-Med-Low	Motorized 2-way or 3-way. Normally closed.	<b>Automatic</b> 4 deg. Neutral Dead Band for sequenced heating & cooling, DPDT	N1 - Unit Mount N2 - Wall Mount N3 - Unit Tamperproof

### 3-SPEED FAN SWITCH ONLY (no thermostat)

L1 - Unit Mount  
L2 - Wall Mount  
L3 - Unit Tamperproof

NOTE: 1. B1 option includes factory installed aquastat

Catalog No. VCBG1106 (Replaces VCBG803)